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(54) **MANUAL TIGHTENED CHUCK**

(57) A manually tightened drill chuck has a split nut (7) mounted in a close manner in a front sleeve (10); jaws (9), on whose respective radial outer surfaces there are formed threaded portions engaging with the split nut, are received in associated bores in a body member (1) of the chuck; the jaws can be caused to reciprocate synchronously through rotating the front sleeve; a rear sleeve (2) causes itself not to rotate relative to the body member of the chuck by using keys (11) arranged around the periphery of the rear portion of the body member of the chuck; an axial thrust bearing (6) and a spring (4) are provided between the front and the rear sleeves for isolating the relative rotation of the front and rear sleeves, and are functional when the jaws chuck the drill to exert an additional chucking force.

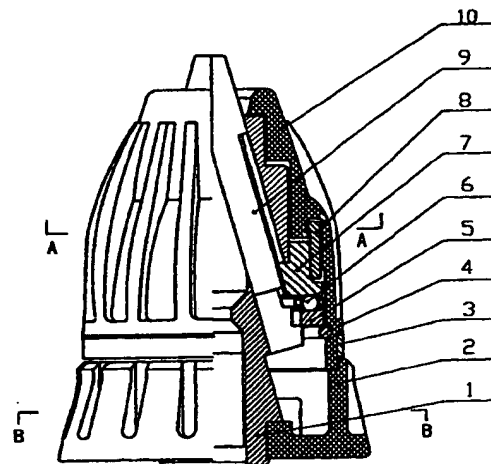


FIG. 1

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## Description

[0001] The present invention relates to a drill chucking device, and particularly, to a manually tightened drill chuck.

[0002] Various drill chucks now in markets each comprises such parts as a body member, jaws, a nut, a bearing, a bearing gasket, a front sleeve, a rear sleeve, a retainer for the front sleeve or a retaining spring. The body member is connected, with interference, to the bearing gasket, the front sleeve and the front sleeve retainer; three jaws are respectively received in three angled bores of the body member; and the nut is disposed in a nut groove of the body member to form a screw transmission with the threads on the jaws. A nut jacket is connected, with interference, to the exterior of the nut to make the split nut become an integral, the front sleeve being mounted on the nut jacket. At the front end of body member there is connected, with interference, with a front end retainer or with a retaining spring to prevent the front sleeve from playing. In operation, by manually turning the front sleeve, the nut can be driven to rotate and the three jaws of the drill chuck can be caused to advance or retract in the angled bores of the body member through the screw transmission, thus allowing the three jaws to open or close to achieve the purpose of releasing or chucking the drill. In above-described configuration, since the nut and the front sleeve are directly connected to have the nut driven to rotate by the front sleeve, during operation, it is easy for a slippage to occur between the front sleeve and the nut, and if a key-slot fitting is used for the front sleeve and the nut, the cost for milling grooves on the nut will be extremely high. In addition, if an interference fitting is used for the rear end of body member and the rear sleeve or a press fitting is used for the rear sleeve and the knurled rear end of body member, it is very easy for a slippage to occur due to a loosening between the body member and the rear sleeve, when the force exerted in operation is too large or the frequency of using is too high.

[0003] The object of the present invention is to overcome the above-mentioned drawbacks of the prior art, providing a manually tightened drill chuck in which the nut can be effectively driven by turning the front sleeve, and the rear sleeve and the rear end of body member are fitted steady, and which is of reliable performance.

[0004] To achieve the above objects of the present invention, said nut jacket have a bottom portion towards the front end of body member, and several key slots are cut out axially in the bottom portion. The keys correspondingly provided on the front sleeve can be inserted into said key slots in the bottom portion of the nut jacket in order that the nut jacket and further the nut can be driven to rotate when the front sleeve rotates, causing the jaws to advance or retract in the angled bores of the body member, thus realizing the opening or closing of the jaws; at the outer wall of the rear end of said body

member, there is milled a cylindrical guide part, which is immediately followed by several symmetrically distributed recesses with parallel axes, and the inner wall of the rear sleeve is also provided with a cylindrical guide portion, several symmetrically distributed keys, which project in the direction of the axis of the portion, are inserted into said recesses, thus causing the rear sleeve and the body member to be fixed and unrotatable relative to each other and avoiding a slippage produced due to a looseness between the body member and the rear sleeve.

[0005] Present invention has the advantages of a rational configuration, convenient assembly, stable performance and reliable operation, and is applicable to various chucking devices of manually tightened drills.

[0006] The present invention will be further described below in conjunction with the accompanying drawings wherein:

Fig. 1 is a configurational schematic view of the present invention;

Fig. 2 is a schematic view in the direction of A-A in Fig. 1;

Fig. 3 is a schematic view in the direction of B-B in Fig. 1;

Fig. 4 is a partial schematic view of a rear end of a body member in Fig. 1;

Fig. 5 is a left side view of Fig. 4;

[0007] Referring to Fig. 1, it shows a manually tightened drill chuck comprising a body member 1, a rear sleeve 2, a decorating ring 3, a retaining spring 4, a bearing gasket 5, a bearing 6, a nut 7, a nut jacket 8, jaws 9, a front sleeve 10 and other components. In the present invention, three jaws 9 are received in the three angled bores in body member 1, threads are provided on the outer sides of jaws 9, and nut 7 is mounted in a nut groove of body member 1; because of the requirements of assembly process, nut 7 is split into two halves; at the inner wall of the lower end of front sleeve 10 is circumferentially provided with a semi-circular groove in which is received a resilient opened retaining spring 4, the latter being blocked under bearing gasket 5; there is a certain spacing between retaining spring 4 and bearing gasket 5, which neither affects the rotation of front sleeve 10, nor causes front sleeve 10 to play beyond the spacing; a nylon decorating ring 3 is sleeved on the outer wall of the lower end of front sleeve 10; and the outer side of nut 7 is attached to a nut jacket 8 with interference to fasten the split nut into an integral. Referring to Fig. 2, it shows more clearly the attachment of the nut jacket and the front sleeve, nut jacket 8 comprising a bottom portion on which several key slots 12' are provided axially while in front sleeve 10 are correspondingly provided axially with several keys 12. When nut jacket 8 is fitted with front sleeve 10, keys 12 on front sleeve 10 can be correspondingly inserted into key slots 12' of nut jacket 8, by rotating front sleeve 10,

to drive nut jacket 8 and further nut 7 to rotate as front sleeve 10 rotates and further through the threaded fitting of nut 7 and jaws 9, to cause jaws 9 to advance or retract in the angled bores of body member 1, thus causing three jaws 9 to open or close so as to achieve the purpose of chucking or releasing the drill.

[0008] Fig. 3 shows the fitting of the rear end of the body member and the rear sleeve, and Fig. 4 and Fig. 5 show the configuration of the rear end of the body member. At the outer wall of the rear end of body member 1 is provided a length of cylindrical guide portion, and on rear sleeve 2 there is a corresponding cylindrical guide portion to control the jitter level of rear sleeve, and the axial play; Behind the cylindrical guide portion of the rear end of body member 1 are cut out several symmetrically distributed deep recesses 11' parallel to the axis, in the axial direction along the cylindrical guide portion, several symmetrically distributed keys project from the rear sleeve, and when the rear sleeve is connected with the rear end of the body member, keys 11 of the rear sleeve are inserted into recesses 11' of the outer wall of the rear end of body member 1, thus making the body member and the rear sleeve fixed to each other to prevent a relative rotation between them.

#### Claims

1. A manually tightened drill chuck comprising such parts as a body member, jaws, a nut, a bearing, a bearing gasket, a front sleeve, a rear sleeve, a nut jacket, a retainer for the front sleeve or a retaining spring, the body member being fitted with interference to the bearing gasket, jaws being respectively received in the uniformly distributed angled bores around the body member, the nut being mounted in the nut groove of the body member to form a threaded transmission by fitting with threads of the jaws, the nut jacket being fitted with interference to the outer side of nut to make the split nut into an integral, and outside the nut jacket being provided the front sleeve, characterized in that: said nut jacket (8) has a bottom portion at its front end towards the drill chuck, on the bottom portion axially several key slots (12') are cut out for transmitting torque, and keys (12) correspondingly provided on the front sleeve (10) can be inserted into said key slots (12') of the bottom portion of nut jacket in order that when front sleeve (10) is rotated, nut jacket (8) is driven to rotate, and further nut (7) is driven to rotate, thus causing jaws (9) to advance or retract in the angled bores of the body member and achieving the opening or closing of jaws (9).
2. A manually tightened drill chuck as described in Claim 1, characterized in that: at the rear end of said body member is provided a cylindrical guide portion and are subsequently cut out several symmetrically distributed recesses (11') with parallel axes, at the inner wall of said rear sleeve (2) there is a correspondingly cylindrical guide portion, and when the rear end of the body member is fitted with said rear sleeve, several corresponding symmetrically distributed keys (11), with parallel axes, projecting axially from the cylindrical portion of the rear sleeve are inserted into recesses (11') of the rear end of said body member, causing the body member and the rear sleeve to be fixed relatively.
3. A manually tightened drill chuck as described in Claim 1, characterized in that on the outer wall of the lower end of front sleeve (10) is sleeved in a nylon decorating ring (3).

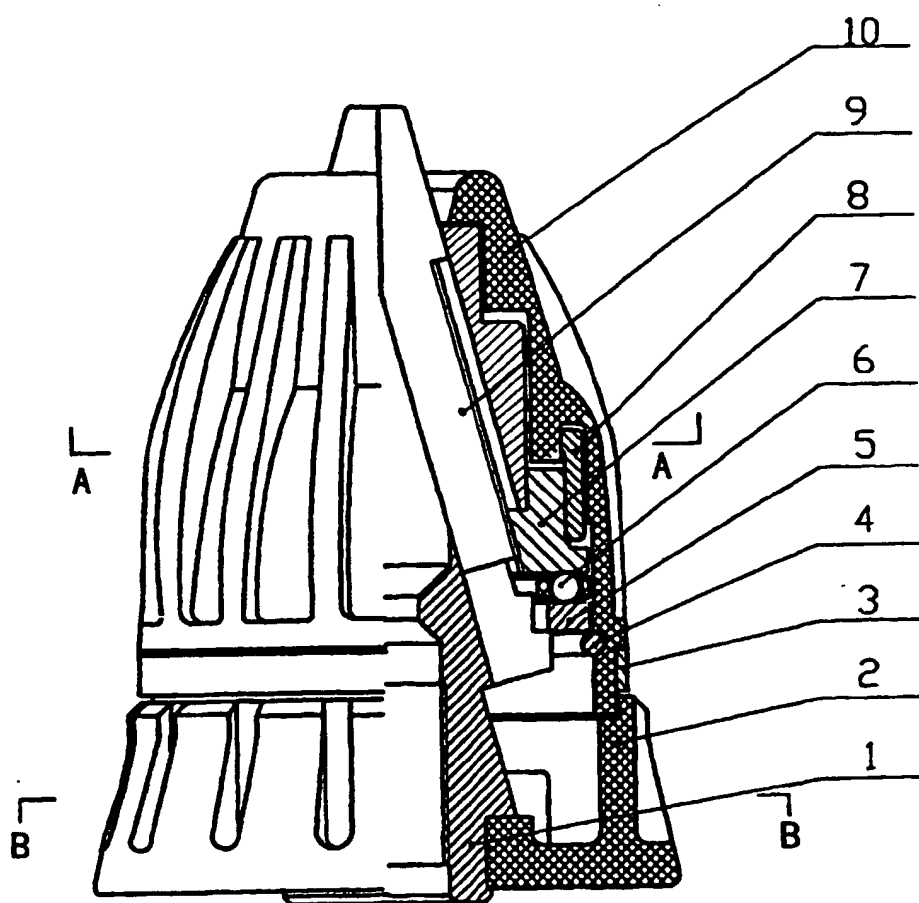


FIG. 1

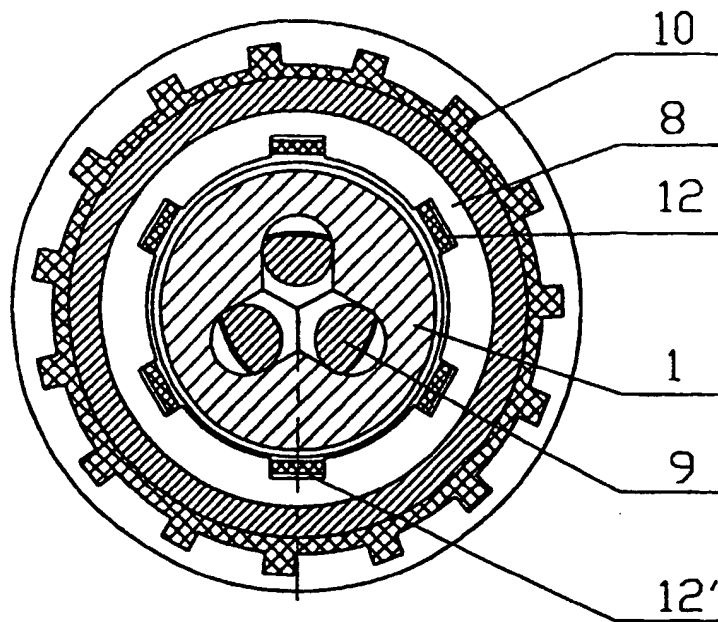


FIG. 2

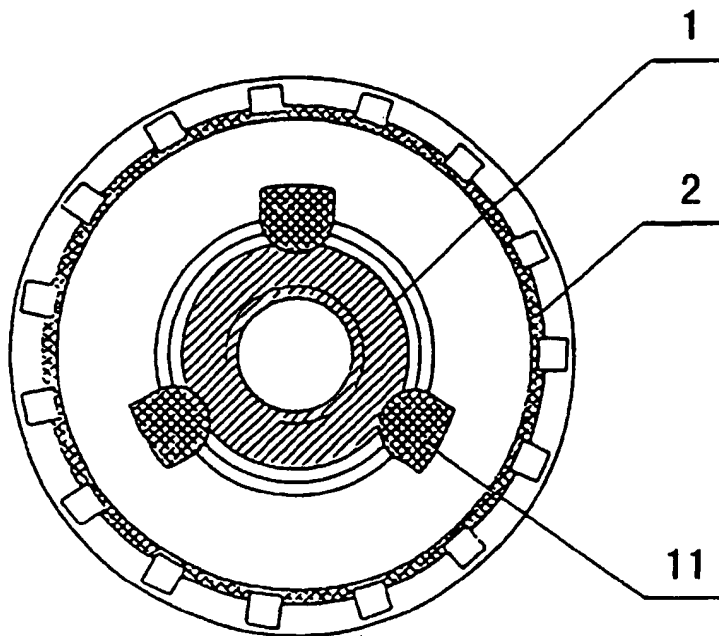


FIG. 3

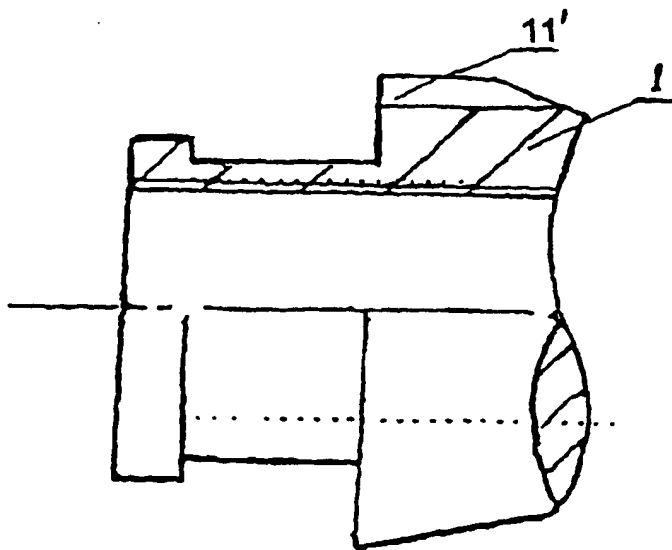


FIG. 4

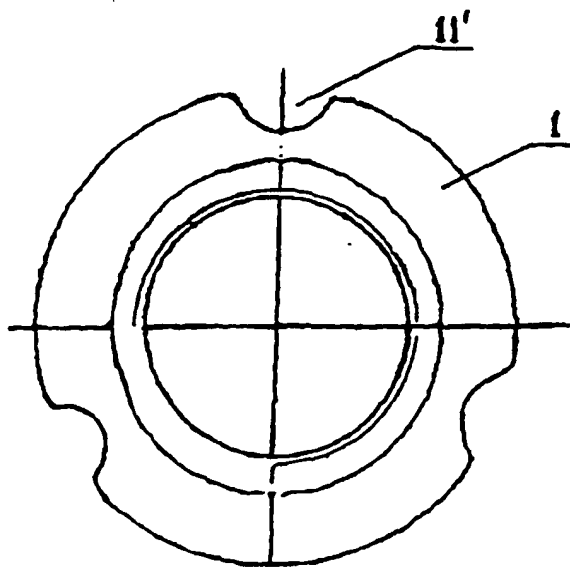


FIG. 5

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN 97/00098

A. CLASSIFICATION OF SUBJECT MATTER		
IPC <sup>6</sup> B23B 31/02		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCH		
Minimum documentation searched (classification system followed by classification symbols)		
IPC <sup>6</sup> B23B, B23Q3/12, 3/14		
Documentation searched other than minimum documentation to the extent that such documents are included in the field searched		
CHINESE INVENTION 1985-1996, CHINESE UTILITY MODELS 1985-1996		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
WPI, CPRS, CNPAT:		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
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X	WO.A.97/06912 · POWER TOOL HOLDERS INCORPORATED 27 FEBRUARY 1997 27.02.97 · ENTIRETY	1
X	CN.C.1023980 · DELTA · 16 MARCH 1994 · 16.03 1994 · ENTIRETY	1
Y	US.A.2996302 · GIRARD S.HAVILAND et al · 15 AUGUST 1961 (15.08.61) · COLUMN 4, LINES 11-39, FIGURES 1, 6, 7	1, 2
Y	CN.A.1123207 · YUKIWA SEIKO · 29 MAY 1996 · 29.05.96 · ENTIRETY	1
<input type="checkbox"/> Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> See patent family annex.		
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Date of the actual completion of the international search		Date of mailing of the international search report
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Name and mailing address of the ISA/CN Chinese Patent Office No. 6 Xitucheng Road, Jimen Bridge, Haidian District 100088 BEIJING, P.R. of CHINA Facsimile No. 86-10-62019451		Authorized officer  WANG Kai  Telephone No. 86-10-62093725

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